ation of the species, with synonymy and records of occurrence, and occasional descriptive notes, with twenty-four plates.

The laborious task involved in gathering together the extant records of those who have in past years contributed to our knowledge of the British Crustacea must not be underestimated; but it is much to be regretted that the authors did not at the outset, in the compilation of such a work, bear in mind more fully the need of the student to whom, if not already an expert, a mere enumeration of our crustacean fauna can be of little assistance in his work. We would much have wished that the authors, with their wide knowledge of the group, had seen well to combine with their work a system of synoptic tabulation, whereby the volume might have been made of more practical service to the student. The portion dealing with the Copepoda bears witness to the extreme care bestowed on this part of the work. Records of occurrence are given in interesting detail throughout, and the many new species for the discovery of which we are indebted to the authors are very fully described, their distinctive characters being well exhibited in the accompanying plates. We would wish that the same careful system had been followed throughout the remainder of the volume, where records of observation are very bare and indefinite, rarely with dates, and distinctive characters are for the most part entirely omitted. There seems, for example, no reason why two succeeding species of Galathea should be dismissed with the bare entry "common," or why, at the opening page, the three species of Ebalia should be passed over without comment, despite the precarious identity of one of them, which some of us still hope to retain.

The retention of errors like "Daphina" (p. 102), "Reptort" (p. 185), and two authors' names, in a footnote to p. 202, both of them mis-spelt, is a disfigurement to the text. *Squalus galeus* and *S. acanthias* (p. 74) are inconsistent with *Galeus vulgaris* and *Acanthias vulgaris* elsewhere. "Whiting-pout (*Gadus fuscus*)," on p. 216, is misleading. On p. 192, for the host of *Asterocheres suberitis* the name *Suberites domuncula* is employed, a sponge which, properly named, does not, so far as we know at present, exist in our fauna.

Including eighty-six inland forms, 808 species of Crustacea are recorded for the area concerned, the marine Copepoda and Amphipoda numbering 274 and 142 respectively. As compared with these figures, Dr. Scott has previously recorded for the Clyde district 855 species, the Sympoda, Amphipoda, and Ostracoda being responsible for the difference.

While feeling a certain sense of disappointment at the general scheme of the work, we are much indebted to the authors for placing at our disposal a valuable record of observation which it is hoped may some day contribute largely to the drawing up of that much-needed work, a handbook to the British Crustacea.

L. R. C.

PALÆONTOLOGY FOR STUDENTS.

Die Leitfossilien aus dem Pflanzen- und Thierreich in systematischer Anordnung. By Dr. Johannes Felix. Pp. x+240; illustrated. (Leipzig: Veit and Co., 1906.) Price 6 marks.

SINCE the publication of the late Prof. Karl von Zittel's exhaustive "Handbook of Palæontology," several smaller books have been compiled on the same plan. The encyclopædic method, which is appropriate enough for a large work of reference, has been adopted in the less pretentious text-books for the use of elementary students who desire only a general acquaintance with fossils. The result is that instead of teaching fundamental principles and broad outlines, these little books provide an overwhelming series of disconnected facts which weary the memory, and palæontology is not only discredited as a mental exercise, but also becomes unpopular with those who really need its guidance while pursuing allied branches of science.

Another of these small books has just been laboriously compiled, with numerous illustrative figures, by Dr. Johannes Felix, the well-known palæontologist of Leipzig. It is neither better nor worse than its predecessors, and illustrates well the disadvantages of the dictionary form for elementary teaching. For instance, among Carboniferous plants, one of the most important groups is that of the Pteridosperms, bearing well-developed seeds in association with fern-like foliage. Dr. Felix's brief catalogue may enable a student to distinguish a Neuropteris from a Pecopteris, and so forth, but it does not give the least clue to the real interest or meaning of these fossils. Again, among vertebrate animals, the theromorphous reptiles are of fundamental value as pointing out the direction in which the cold-blooded land animals passed into the warm-blooded mammals. The book before us, though pretending to deal with fossils at varying lengths according to their degree of importance, does not even mention that the Theromorphs were chiefly land animals. It merely catalogues, with a desultory statement, the skull of the sea-reptile Placodus, which is probably not a Theromorph at all, and certainly gives no conception of the nature of the group in question.

Still worse, this compilation and condensation of matter from previous text-books destroys all effort to bring the subject up to date. It is much simpler to select a few miscellaneous facts from an exhaustive collection, and to purchase a set of electrotypes in a wholesale manner, than to make a judicious use of original memoirs and prepare new drawings to illustrate the science as it is now understood. We therefore look in vain among the "Leitfossilien" enumerated by Dr. Felix for any allusion to the European Lower Palæozoic fishes, the South African Triassic reptiles, the Egyptian Tertiary mammals, and the remarkable discoveries in South America, which have revolutionised many ideas in palæontology during the past two decades. Students may be able to name a few common European fossils if they happen to have

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the patience to pore over this new book, but they will not gain much insight into the science these fossils illustrate, and their enthusiasm must be unusual if they retain any desire to proceed with palæontological research when they have completed their course. A. S. W.

THREE ASPECTS OF ELECTRICAL ENGINEERING.

Applied Electricity: a Text-book of Electrical Engineering for Second Year Students. By J. Paley Yorke. Pp. xii+420. (London: Edward Arnold, 1906.) Price 7*s.* 6*d.*

The Electrician Primers. Edited by W. R. Cooper. Three volumes in one. Vol. i., Nos. 1–24, Theory. Vol. ii., Nos. 25–55, Traction, Lighting and Power. Vol. iii., Nos. 56–80, Telegraphy, Telephony, Electrolysis and Miscellaneous Applications. (London: *The Electrician* Printing and Publishing Co., n.d.) Price 10*s.* 6*d.* net.

Electricity of To-day: its Work and Mysteries described in Non-Technical Language. By Charles R. Gibson. Pp. xiv+347. (London: Seeley and Co., 1907.) Price 5*s.* net.

THE three books before us suggest an interesting comparison of three points of view from which any applied science can be regarded. Each covers, or attempts to cover, in a more or less summary fashion, practically the whole subject of electrical engineering, but as each appeals to an entirely different audience, the difference in method of treatment is necessarily very marked. Mr. Yorke's volume is written for the student who proposes to become an electrical engineer, the genuine professional, whose chief assets must be knowledge and brains. The readers of the *Electrician* Primers will mostly be found amongst artisans, amongst the class not unjustly distinguished from electrical engineers by the name of electricians, people who require a fair amount of knowledge, but who can get on with a very limited amount of understanding. Finally, Mr. Gibson's book makes its appeal directly to the general public, or to that section of it which shows an intelligent desire to keep abreast of the times and is not content to utilise the advantages of civilisation without some attempt at appreciating the manner in which they are obtained.

The great necessity for the professional engineer in his college training is to obtain a sound foundation on which to build by means of future experience. Facts are easily learnt and as easily forgotten, whilst even if remembered they are likely to prove of but trifling value in actual practice. No man can say when he is at college what branch of his profession is going to occupy his future, and it should be the aim, therefore, of any second year's course to impart a sound knowledge of the way in which the fundamental physical principles of electricity and magnetism are utilised in the practical applications of electrical engineering. Mr. Yorke has kept this point of view clearly before him in the book under review, and has succeeded on the whole very well in elucidating the connection between theory and practice. There is no question, however, but that the value of a book of this kind depends almost entirely on the lectures and laboratory work that accompany it. Text-books alone are so incapable of giving sound instruction in electrical engineering that one is almost justified in maintaining that to criticise them apart from the course with which they are to be used is idle. The best that can be said is that the book would serve as a very useful model on which to base a second year's course of instruction. It is, perhaps, unwise that manufacturing methods should be described; in one or two instances this has led to mistakes which might have been avoided.

To attempt a detailed criticism of the *Electrician* Primers would be to write a volume as bulky as that which they themselves form. They range over such diversified subjects as "Curves and their Use," "Electric Railways," and "Photo-engraving," to quote but a few examples. Each primer forms a small handbook, and the artisan engaged in any particular branch of work would gain a fair insight into the *raison d'être* of his various operations by the study of those primers dealing specially therewith. As a reference book also the complete set should prove useful. The electrician occupied with tramways may occasionally find it necessary to know something about arc lamps or telephones, and in such cases the rough general information he requires could probably be obtained from these primers. The whole ground of electrical engineering is covered very completely by the series.

The correct person to review Mr. Gibson's book is a member of the general public and not an electrical engineer, as the principal questions to be answered are, Is it intelligible? and Is it interesting?

It is a hard task to describe some of the more complicated developments of electrical engineering in simple, non-technical language, and to avoid incorrectness in the search for simplicity. Mr. Gibson has, however, accomplished this task with remarkable skill, and for many passages deserves to be sincerely congratulated. There is too great a tendency, perhaps, to the relation of amusing little anecdotes which do not teach much, and to what may be described as sensationalism, but this is very natural and perhaps excusable. The interest of the layman, no doubt, requires to be sustained by such illustrations as the photograph of a church wrecked by lightning, or of an attractive young lady making afternoon tea with an electric kettle. But neither of these pictures has much educational value. To cavil is, however, ungracious; the more the public can be interested in electricity the better for the whole trade and profession, and Mr. Gibson's book will undoubtedly help on the work of progress. One is apt to laugh at "popular" science, but Mr. Yorke's students and the *Electrician's* artisans would all be amongst the unemployed without the market which Mr. Gibson helps to provide.

MAURICE SOLOMON.

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